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PULLING V-BELT

The present invention relates to a pull type belt as defined in the preamble of claim 1.

Such belts are generally known in the art, either for application in fixed ratio, or for variable ratio transmissions. Such so called V-belts, simply called "rubber belts", have since long essentially been produced with a body of a natural or synthetic rubber material, and have a reinforcing tensile means in the form of a layer of a plurality of tensile elements such as cords, e.g. produced in a synthetic fibre. Commonly the cords are incorporated in one layer, with the cords lying side by side. The tensile means is embedded in a rubber material. Within the layer, sometimes denoted cushion layer, commonly a specific type of rubber is applied for optimising the bounding between rubber and tensile element.

One limitation of this known type of belt is that the amount of transmissible power, to be transferred from one pulley to another, by a wedging, i.e. clamping action of the sheaves of a pulley, is limited by the amount of power that can be transferred from the rubber to the tensile means. Thus, the force transferable from one pulley to the other is limited by the maximum load of the connection between the rubber and the cords within the belt.

Another and major drawback of the known V-belt concerns the smallest running diameter that can be attained at a virtually infinite time of operation of the belt. This phenomenon is especially relevant at V-belts for application in variable ratio transmissions. In these applications it is important to have a sufficiently lateral bearing or contacting surface for contacting the sheaves of a pulley, so as to guarantee a proper and smooth shifting and running feature of the belt. However, this requirement increases the radial height of the conventional V-belt and therewith the bending stress in the belt. Bending stress occurs in a high extend at the radial outer side of a belt. Probably for this reason, the tensile elements of the known, i.e. conventional rubber belt are located closest possible to the radial outer surface of belt. The bending stress also affects the connection between the body and the tensile elements, which connection plays an important role because of a requirement to have a sufficiently large surface area on the tensile elements for bonding, i.e. adhering these to the body material of the belt. The bonding should be such that a meaningful amount of force can be transmitted still during e.g. an industrially meaning full period of operation time of the belt.

One solution for reducing internal bending stress commonly applied in commercialised belts is to provide laterally extending, generally V-shaped openings at the radial interior side of the belt. In this way the bending height of the belt is reduced with the radial depth of the openings. Still a relatively high pulley contacting face may be maintained at the rubber bodies between these grooves. Consequently, the bending stress is reduced proportionally with the depth of the groove.

Yet, many commercial applications still require a low cost solution with an even smaller smallest running diameter feature of the belt, e.g. at application in the drive line of scooters, or under the bonnet of a personal vehicle where space is scarce. Scooters have. located near the rear wheel, a relatively bulky transmission case as part of the drive line. The drive line, in particular the bulkiness thereof limits the design freedom of this two wheeled motorised vehicle.

One manner for attaining a very small running diameter of a rubber belt is to design a relatively wide width belt with a plurality of endless V-shaped grooves provided longitudinally to the interior, i.e. the radial inner side of the belt. In this manner a belt of relatively low height, allowing a relatively small smallest running diameter is attained. In this solution the ratio is fixed and the belt is no longer applicable in a variable transmission.

Another disadvantage of the known V-belt is that the rubber body required for proper clamping between the sheaves of a pulley is entirely disposed at the radial inner side of the tensile means. Location at the radial outer side of the tensile means could cause the rubber body part to deform, i.e. to bulge out in radial direction, under the clamping action. The deformation may be such that the function of the body is lost at least to a large extend. Bulging out is in conventional V-belts a.o. counteracted by a radial outer layer of reinforced material. The clamping body for the belt is consequently situated below the tensile means, i.e. at the radial inner side of the belt. When transmissions with small diameters are sought for, e.g. at limited space applications, this phenomenon reduces the range of transmission ratios that can be attained.

Another solution known in the art of pull belts is provided by EP-A-0 826 901. This solution describes a relatively expensive belt of a relatively complicated structure, directed to and particularly suitable for relatively high power transmission systems. The design of this belt features transverse elements, so called blocks, having a fixed position relative to a tensile means, denoted load carrier. The load carrier consists of two endless parts, each of which is placed into laterally extending slots of the transverse elements. The load carriers each have a rubber like elastically deformable

material body of noticeable height, in which a centred layer of tensile elements in the form of strings is incorporated. The tensile means and the manner of incorporation correspond to what is known from conventional V-belts, and have the associated draw back of limited transfer of force per unity of width. The transverse elements of this type of belt are produced with a metal core coated with a synthetic material so as to achieve both a desired amount of axial stiffness and a required amount of friction with the sheaves of a pulley. This design renders a relatively complicated manufacture. Also, the body of the load carriers or tensile means show a relatively complicated profiled shape, different at the radial inner and the radial outer surface, and matching the profiling of the lateral slots of the transverse elements. After the driving force has been transmitted from the sheaves to the transverse elements, the latter carry this force over to the tensile bodies by said different upper and lower profiling. Subsequently the force is conducted from the body of the load carrier to the layer of cords in the conventional manner. The profiling of the elements and of load carrier per se, each with two shapes, may disadvantageously form an additional drawback at manufacture of the belt.

Yet another proposal for improvement of the conventional V-belts is provided by US 4,915,677. The publication discloses a pull belt with one or a plurality of a so-called tension resistant member, embodied by a layer of cables. This known pull belt is provided with transverse elements preferably of a metal material which are opened to the radial outer side by a recess. The bottom side of the recess is profiled for receiving a plurality of cables disposed in a layer at a level in the upper, i.e. radial outer half of the elements. For the sake of improvement of the force distribution in the element, a filler element is present, filling the recess and aiding in the bonding between the cables and the elements. The bonding is enhanced by an elastomeric mass joining the transverse elements and the tension resistant member. Thus, also the design proposed by this document suffers from the drawback of the conventional V-belt, in that the transmittable force is limited by the force transmittable from the elastomeric body to the cables incorporated therein. Moreover fabrication, i.e. manufacture is also complicated by the requirement of precisely receiving the cables in the relevant recesses between the element and the filler. A disadvantage exists in that the pulley contacting limbs tend to deflect inwardly under high pressure, so that insufficient clamping force is taken up by the element as a whole. It was suggested to fill up the recess for receiving the tensile means, i.e the space between the limbs by a filler plate, preferably to be welded between and against said limbs. This solution complicates the

design of the belt and raises production costs. The belt according to this solution was dimensioned to accommodate relatively large power transmissions.

The present invention thus seeks to improve the pull belt type for variable transmissions in such a manner that a relatively small smallest running diameter can be attained at application in a transmission, in particular a continuous variable transmission, without undue sacrifice to durability, i.e. life span of the belt, nor to force transmittable by the belt, and without undue complication of the design and manufacture of the belt. In particular the invention aims to provide a design technically and economically applicable and without undue manufacturing efforts, more in particular in the area of relatively small power transmissions like at the conventional rubber V-belt designs.

According to the invention, such is attained by the characterising portion of claim 1. The ultimately thin tensile element as featured in the design according to the invention effects a very low bending stress in the tensile element, thus enables a relatively long life time of the belt, or very small smallest running diameter of the belt at equal life time. This feature of the invention is made possible by a measure to extend the tensile element over a broadest possible width, i.e. possibly as broad as the belt or any element incorporated therein, however without contacting the sheaves of the pulley. In practice good results may be achieved with the width being from 0.5 up to 1 times the width of the belt or, if transverse elements are incorporated in the belt, from 0,5 to 0,9 times the width of the element at the effective running diameter of the belt. The tensile element is according to the invention preferably located central to the radial height of the belt. By this measure according to the invention, the tensile stress within the tensile means is reduced to a minimum, specifically since it is combined with the feature of being a thin bladed means, i.e. having radial thickness of minimal amount.

By the above said features a belt according to the invention may in a first embodiment be used favourably both as a replacement of V-belts having a plurality of longitudinal grooves, since it requires only a small amount, in a flat layer of elastically deformable material, preferably at each side of the tensile means for creating a comparable amount of friction surface, while it may be bend easily over even smaller diameters and with equal contacting features at both radial sides of the belt.

The belt according to the invention may in a further elaboration also favourably be applied as a replacement of the tensile means as used in an arrangement like EP-A-0826901 by adopting the appropriate profiling for the elements thereof. With a belt

according to the present invention, the said V-belt arrangement may adopt even smaller running diameters, smaller pitch distances and higher power throughput.

In a third embodiment of the invention the belt is produced suitable for a continuous variable transmission by the provision of transverse means having a centre opening through which the tensile means is passed, and with an elastically deformable material located longitudinally in between the transverse means, and having an adhesive connection with a radial surface of the tensile means.

In the above embodiments of the invention, a double layer of ultra thin material, is favourably applied, of which according to the invention radial facing sides are mutually connected, either mechanically or by an ultra thin layer of gluing material such as metal glue, an ending piece of strap is made endless. This is according to the invention most favourably performed when at least virtually the entire longitudinal length of so created endless means is provided with a double layer. Preferably however, a minimal overlapping part of three layers is created, e.g. up to 5% of the longitudinal length. In case the belt according to the invention is provided with transverse elements according to the invention, no in between glue is required, since use is favourably made of an intermediate elastically material adhered to both radial sides of a combined layer of tensile means, preventing the tensile means from being pulled to a loose assembly, forming a particular embodiment of mechanical connection between end parts of a single strap element.

The invention may also be characterised as a tensile belt where elasticity and stiffness requirements of the different subcomponents are split up in such a way that they are optimal for the requirement of that component. This leads to a tensile belt that is suitable for very smnall running radii and which has minimal internal losses leading to a high efficiency belt and low operating temperatures, which is specially important for belts that are partially or completely composed of polymers and/or elastomers.

In the current belt, transverse elements that are stiff enough to prevent deformation of the belt between the pulleys, reducing internal friction losses and forming a beam to resist the required clamping force of the pulley sheaves. These elements may favourably relatively easily be provided with a relatively high resistance to wear. The belt further includes spacing means of an elastic material with negligibly modules of elasticity to eliminate bending stresses in the belt and with a good bonding performance with the radial surface of e.g. a metal strap like tensile means. Thus a good transport of driving force from the tensile element to the transverse elements or vice versa is made possible. The spacing means is in this arrangement compression

loaded by the force transfer between tensile element and transverse element and vice versa, preventing peel of the bonding layer between spacing means and tensile element.

When a double layer of tensile sheet element is used, according to a specific embodiment of the invention, a heavy duty metal grease is used between them, while the sides are being sealed with a same elastomere as for the spacing means, leading to wear reduction between the layers.

The invention will now be elucidated further according to a drawing in which:

FIGURE 1A to 1C relate to conventional rubber V-belts;

FIGURE 2 is a first embodiment of the V-belt according to the invention, with transverse elements mechanically coupled to a tensile means;

FIGURE 3 is a first alternative embodiment of a V-belt according to the invention;

FIGURE 4 is a perspective view of second and preferred alternative embodiment of the V-belt according to the invention;

FIGURE 5 is an illustration of different techniques according to the invention for realising an endless tensile means within the belt;

FIGURE 6 schematically shows an alternative and preferred embodiment of the tensile means, i.e. consisting of two layers;

Figure 7 illustrates an advantage of the belt according to the invention when applied as a replacement belt for a conventional belt;

Figure 8 illustrates a preferred shape of the transverse elements;

Figure 9 by sectional views of different transverse elements, illustrates possible shapes of a transverse element according to the invention;

FIGURE 10 illustrates a common manner of operating a conventional rubber V-shaped belt in a continuously variable transmission;

FIGURE 11 illustrates the possible reduction in dimension of a transmission or variator when the belt according to the invention is applied instead of a conventional belt.

The following description departs from the overall shapes and elements of a V-belt and of the associated and mentioned manufacturing processes as commonly known per se. The invention is primarily found in the new design of the belt. Secondarily the order and manner of assembling the separate components in the belt according to the invention are mentioned.

In figure 1, three conventional rubber belt types are represented, a first one suited for transmissions having a fixed transmission ration. A second one typically

adapted for variable ratio transmissions, and a third one typically adapted for uses with small running diameters, however, only suitable for a fixed ratio transmission.

In figure 1A the conventional rubber V-belt 1 for fixed ratio transmission is shown with an outer coating 2 all around the belt 1. It has a rubber body 5 of soft elastic nature, and a thin outer coating of a relatively hard elastic nature, however providing resistance to wear. Embedded in an embedding layer 3 of material specifically suitable for connecting to a tensile means 4. The tensile means 4 consists of a layer of relatively thin rope, e.g. a Kevlar material, wound equally distributed over the width of the belt. The radial thick body 5 prevents the belt from adopting small running diameters, however promotes a stable running of the belt in the V-groove between the sheaves of a pulley.

The belt according to figure 1B is modified in that no surrounding is outer body is provided, in that the body is of a stiffer rubber type and is at the radial inner side provided with transverse grooves, commonly distributed at even distances of between 0.8 and 1.5 cm. At the radial outer face, a reinforced layer of relatively stiff material 6 is provided, supporting the stiffness of the belt in axial direction, thereby enhancing the efficiency of the belt.

The belt according to figure 1C is provided with V-shaped grooves 8 extending in longitudinal direction, thereby increasing, i.e. regaining contacting area with correspondingly grooved fixed ratio pulleys of a small running diameters. No outer support layer 6 is required since the belt is not loaded with axial thrust originating from sheaves of a pulley.

Figure 2 represents a first principal modification of the V-type pull belt in accordance with an idea underlying the invention. It shows a separation in function of a transverse clamping means and a tensile loadable body, in casu embodied by a flat strip of a tensile loadable material, preferably spring type steel or a synthetic tape of a synthetic uni directional (UD-) material. A transverse element is mechanically coupled to the tensile body, in casu by a pop nail construction known per se, wherein the nail is part of the transverse element. Internally it shows a U-shape, of which the bottom part forms a contacting face for contacting the tensile body. It is of a width matching that of the tensile body. The contacting face is centrally provided with a nail part. The transverse element may be composed of metal but is preferably entirely composed of a synthetic material. The nail part is inserted through an opening in the tensile body, and subsequently popped, either mechanically in case of a metal nail or thermo-mechanically in case of a synthetic material.

The strip forming the tensile body, composed of metal like spring steel or of unidirectional synthetic tape, is of a thickness considerably smaller than that of the cords applied in conventional tensile bodies. Typically the reduction in thickness is of a factor between 5 and 10 times the conventional thickness. According to the invention the metal or synthetic strip applied is of a thickness between 0.04 and 0,25 mm, more preferably up to 0,1 mm, compared to conventional cord thickness of between 0.6 and 1.2 mm. This measure in accordance with the invention effects a considerable reduction of bending stress within the tensile body, implying a longer life time when a belt with such tensile element is run at a corresponding running radius, or an equal life time at a considerably smaller running radius.

The immense reduction in thickness of the tensile element is in accordance with the invention made possible through the fact that the tensile element is produced strip like, i.e. entirely flat. By this feature, compared to conventional layers of cord, the required small amount of space between the cords is entirely occupied in width wise, i.e. lateral and axial direction. Very importantly, by this design of the tensile element, very high contacting pressures between tensile body or ~element may be realised since a danger of the cords cutting through the body of the transverse elements or of an additional layer within the tensile body is strongly if not entirely taken away. In the present design, the transverse element and the tensile body mutually engage for driving action mechanically, both by said inserted nail and by a frictional contact between contacting face and the tensile body. Another characterising feature of a design in accordance with the invention, is that the tensile body is located centred in radial direction relative to the radial height of the contacting faces of the transverse elements, thus further reducing the tensile load and stress on the tensile element in the belt. In the present embodiment where the tensile body is solely formed by a tensile strip, and where the thickness of the strip may virtually be neglected, this implies that the effective point of contact or location of the friction force of a contacting face is located virtually centred relative to the radial height of the contacting faces of the element.

Figure 3 represents an alternative construction for the belt according to figure 2, in which the tensile body is provided with lateral ear parts or in reversed sense, with slot like openings. The openings show axial contacting rims by which the tensile body is contacted. The openings have a longitudinal depth fitting the thickness of a transverse element, at least the limb part thereof. The total width of the tensile body is less than the local width of the transverse elements, so as to prevent the tensile body

from contacting the sheaves of the pulley. The axial width of the slotted opening substantially corresponds to the local width of the limbs of the transverse elements. Preferably the openings are created by bending the material originally present in the slot area in downward or upward direction, according to an axial folding line coinciding with an axial contacting rim for contacting a transverse element. The drawing, the transverse element may be provided with retractable limb parts for keeping the tensile element in place. Overlapping ends of the tensile element are fixed in longitudinal direction via said ear parts

The tensile body may also be produced as a tensile strip coated with a an elastically deformable material such as vulcanised rubber or a synthetic rubber material. The presence of the elastic material in this context assists in levelling local pressure peaks, thus enhances lifetime of the belt.

In the embodiments according to figures 4 advantage is taken of the circumstance that in accordance with the invention it is relied on the shear force feature of the elastically deformable material of the intermediate body, rather than on the tensile force coefficient of this material, implying that a relatively high tensile force can be carried over in the tensile means. For the latter reason a V-belt according to the invention may be embodied with a relatively small, i.e. thin layer of elastic material between the ends of the tensile element.

Figure 4 schematically depicts the structure of an embodiment according to the invention in which connection between the tensile element and the transverse element is realised through an elastically deformable material, firmly bonded, i.e. adhesively connected to the strip element, e.g. glued or otherwise bonded, with the material preferably extending over the width of the strip. In the embodiment according to figure 4, first the elements are shifted over the tensile element after which the elastic material is applied. According to an alternative embodiment of a manufacturing process, the tensile element is first coated with the elastic material after which the transverse elements are shaped with an injection moulding machine. In both embodiments for a manufacturing process the tensile body consists of a mirrored profiling at each of both radial inner and outer surface face of the tensile means. The elastic material is at least present longitudinally in between two adjacent transverse elements and is firmly connected to the strip element, i.e. it has an adhesive bonding, either or not enhanced by mechanical or chemical treatment of the radial surface area of the tensile means. It has a very high resistance against shear and peeling, alternatively denoted a high coefficient of adhesion. Preferably vulcanised rubber is used for this purpose,

however, also a combination of dedicated surface treatment and a subsequent application of synthetic rubber showed useful results.

The transverse element in these embodiments extends two sided over the tensile body, thus shows a centralised slotted opening fitting a cross section of the tensile body. In accordance with the invention, the elements are moulded in location around the tensile means. Equally however, the transverse elements may be cut out of a piece of suitable material, or may be individually (injection) moulded and subsequently be tacked or stringed to the tensile strip, brought into mutually correct position by means of a mall. In case of moulded elements, a distance boss is provided to the elements. Subsequently the elastic material is provided by injection or transverse moulding, intermediate to the transverse elements. Application of the intermediate elastic material in the embodiment according to figure 4 can e.g. be done by one or more injection nozzles directed to the surface of the tensile strip. At each embodiment, the elastic material is provided over a thickness of more than 1 mm above the strip surface and preferably at a maximum of half or less than a quarter of the total radial height of the contact face of a transverse element. However, the gap between transverse elements may without undue influence to the basic function of the belt also be filled entirely.

Preferably the central opening in the transverse element shows a rounding or a chamfer of the edges as seen in radial and – belt wise - longitudinal cross section. In this manner both the tacking of the elements over the strip is enhanced by the presence op a funnel like entry of the opening. Also, the contact between the element and the elastic material is optimised. Further it is realised that any damaging contact between element and tensile strip, likely to be caused by a high surface pressure due to sharp edges at the element is minimised. The latter shape of the element slot according to the invention, at driving activation of a transverse element by the sheaves of a pulley, urges the element on to the intermediate material. By the chamfer or otherwise manner of rounding, a funnel-like opening is created at the central opening of the element. The elastic material between two transverse elements, by the funnel shape, tends to become gradually compressed towards the surface of the tensile strip under the influence of any longitudinal driving force of a transverse element, thus causing the internal friction capacity of the elastic material and the friction with the strip surface to be increased, optimising the transfer of driving power from the transverse element to the tensile strip. Figure 8 and 9 show examples of such above described funnelled openings, in casu with a rounded, respectively chamfered opening. Due to

subsequent injection of the intermediate material, the latter adopts the shape created in the opening of the element.

In the embodiment according to figure 4, the belt according to the invention may be produced by coating the strip element first, with a rubber of synthetic rubber like material, preferably in a profiling matching the above described chamfer or rounding, preferably symmetrically at both radial sides of the tensile body, and subsequently moulding the transverse elements in place, using a suitable mall for maintaining the tensile body in a desired position and shaping the transverse elements.

In accordance with the invention the transverse elements are produced of a very stiff, i.e. non-compressible synthetic material, preferably fibre reinforced, having a high temperature resistance, i.e. preferably over 100 or even up to 150 degrees Celsius, and with a reasonable coefficient of friction in combination with metal sheaves. One such material is of the acetal group (POM). Any alternative matching such criteria, such as high tech thermosets like phenol based materials or high tech engineering plastics with or without fibre filling may equally be applied however. Although a metal transverse element could be used, the invention applies a synthetic material so as to more easily provide the elements with the desired shape details, and so as to enhance manufacturing of the elements and equally to enhance assembly of the belt according to the invention.

Figure 5 illustrates several manners of realising an endless tensile means produced in a single layer effectively. The upper manner simply shows two end parts of a tensile means overlapping radially. A mechanical stopping means may be provided according to the invention, either by bending an end part of the tensile means transverse to the longitudinal direction, or by locating a rim on a radial face, e.g. a soldered rim. The lower most part of the drawing illustrates a manner of welding the two end faces of the tensile means. The tensile means is for this purpose cut obliquely.

Figure 6 in accordance with the invention shows a preferred manner of incorporating a tensile element in the new V-belt. In this shown embodiment the tensile means is produced in two layers. In the embodiment shown the tensile means consists of two parts. Preferably, though not depicted, the tensile means is produced of one piece, with the ends overlapping to a small extend. In both embodiments the ends are mutually interconnected via the transverse elements. Additional mechanical connections may be used, e.g. via the intermediate elastically deformable means. In this manner the tensile element is virtually made endless. The thickness of the

element is in this case taken half the thickness required for transferring a force in the embodiment with one layer effectively.

Figure 7 shows a further advantage of the present invention which is most favourably used when the current belt is applied as a replacement belt for a conventional rubber belt, i.e. in a variator of otherwise conventional dimension. Since the tensile means is located radially centred, the driving force of the transmission is effectively located at radial lower point of up to 5 mm. This phenomenon is of a relative high significance at the smallest diameter, compared to the situation at the other driving wheel where the largest running diameter occurs at such instance. Thus in the initial stage of transmission, an improved so called launch performance, e.g. at scooters is achieved.

Figure 8 in detail shows a preferred embodiment of a transverse element, with distance bosses for mutually easily positioning the elements when strung on a tensile element. The bosses are located at the radial level of the tensile means. By the cross section on the right hand side of the figure, the rounded contact face of the elements for contacting the tensile means is shown, creating the earlier described, and favourable funnel shape. However, as illustrated by the comparable cross sections in figure 9, different shapes be chosen, including a triangular wedge shape and a simple slotted opening.

Advantages of the belt according to the invention include the reduced smallest possible running diameter, and the small, material saving transmission case consequently required, an increased efficiency of the belt due to reduction of internal losses otherwise caused by compression, both in longitudinal and in axial direction, and an increased life time of the belt due to the use of reinforced, non-compressible synthetic material in the transverse elements, and to the reduced tensile stress in the tensile element, due to it's strongly reduced thickness. Moreover, the belt according to the invention may realise a significantly increased transfer of power due to the lower position of the tensile element as compared to conventional rubber V-belts.

Figure 10 and 11 together provide an indication of the effects attainable with a belt according to the present invention. In Figure 10, schematically part of transmission line of a scooter is shown with the contour of a pulley sheave to the front side at the left hand side of the figure and one to the rear side at the right hand side in the figure. At the front side the smallest possible running diameter is utilised since the take off or launching of a vehicle is only short lived. At the rear wheel however, the smallest running diameter, occurring in overdrive (OD) situation occurs most of the operation

time of the vehicle. So as to enhance life time of the belt, the smallest running diameter is commonly limited to a diameter about twice that of the smallest diameter at the front pulley. With a belt designed in accordance with the invention, such limitation may be omitted. Moreover the smallest possible running diameter is even further reduced, so that for achieving a comparable transmission ratio, the diameter of the pulleys may be reduced.

Figure 11 shows that the overall length of a transmission drive line may be significantly reduced. This may amount from about 75% of the smallest possible distance between the axes of two conventional pulleys up to almost 50% of the currently applied space between the pulleys of nowadays scooters. Thus the invention also relates to a scooter or alike vehicle, having a variator, with a belt according to the invention, and integrated with the engine, i.e. incorporated within the dimensions thereof, and having a fixed ratio transmission, e.g. by a belt between the variator and the rear wheel. When a belt according to the invention is merely applied as a replacement belt, i.e. with a conventional dimensioning of the variator, still a significant advantage exists in a structurally higher potential of transferring power due to the low position of the tensile element. It may a.o. be used to enhance the driving characteristic of such vehicle in the LOW driving mode. For instance, the coupling may be tuned to close somewhat earlier, so that a driving force may already be transferred at lower engine speed, due to the enhanced torque transmission capacity in combination with a belt according to the invention.

The invention apart from the preceding description and all details of the drawing in particular relates to the following set of claims.